

04-11-00

Practitioner's Docket No. 442-009325-US(PAR)

PATENT

Preliminary Classification:

Proposed Class:

Subclass:

NOTE: "All applicants are requested to include a preliminary classification on newly filed patent applications. The preliminary classification, preferably class and subclass designations, should be identified in the upper right-hand corner of the letter of transmittal accompanying the application papers, for example 'Proposed Class 2, subclass 129.'" M.P.E.P. § 601, 7th ed.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of

Inventor(s): Mikael LINDEN, Olli IMMONEN, Mikko LUKKAROINEN, Piotr COFTA

WARNING: 37 C.F.R. § 1.41(a)(1) points out:

"(a) A patent is applied for in the name or names of the actual inventor or inventors.

"(1) The inventorship of a nonprovisional application is that inventorship set forth in the oath or declaration as prescribed by § 1.63, except as provided for in § 1.53(d)(4) and § 1.63(d). If an oath or declaration as prescribed by § 1.63 is not filed during the pendency of a nonprovisional application, the inventorship is that inventorship set forth in the application papers filed pursuant to § 1.53(b), unless a petition under this paragraph accompanied by the fee set forth in § 1.17(i) is filed supplying or changing the name or names of the inventor or inventors."

For (title):

NETWORK ELEMENT

CERTIFICATION UNDER 37 C.F.R. § 1.10*

(Express Mail label number is mandatory.)

(Express Mail certification is optional.)

I hereby certify that this New Application Transmittal and the documents referred to as attached therein are being deposited with the United States Postal Service on this date April 10, 2000, in an envelope as "Express Mail Post Office to Addressee," mailing Label Number EL336863125US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Deborah J. Clark

(type or print name of person mailing paper)

Deborah J. Clark
Signature of person mailing paper

WARNING: Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. § 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

*WARNING: Each paper or fee filed by "Express Mail" must have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. § 1.10(b).

"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

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04/10/00
1c781 U.S. PRO

1c675 U.S. PTO

09/546439

04/10/00

09/546439-041000

1. Type of Application

This new application is for a(n)

(check one applicable item below)

- ☒ Original (nonprovisional)
☐ Design
☐ Plant

WARNING: Do not use this transmittal for a completion in the U.S. of an International Application under 35 U.S.C. § 371(c)(4), unless the International Application is being filed as a divisional, continuation or continuation-in-part application.

WARNING: Do not use this transmittal for the filing of a provisional application.

NOTE: If one of the following 3 items apply, then complete and attach **ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF A PRIOR U.S. APPLICATION CLAIMED** and a **NOTIFICATION IN PARENT APPLICATION OF THE FILING OF THIS CONTINUATION APPLICATION**.

- ☐ Divisional.
☐ Continuation.
☐ Continuation-in-part (C-I-P).

2. Benefit of Prior U.S. Application(s) (35 U.S.C. §§ 119(e), 120, or 121)

NOTE: A nonprovisional application may claim an invention disclosed in one or more prior filed copending nonprovisional applications or copending international applications designating the United States of America. In order for a nonprovisional application to claim the benefit of a prior filed copending nonprovisional application or copending international application designating the United States of America, each prior application must name as an inventor at least one inventor named in the later filed nonprovisional application and disclose the named inventor's invention claimed in at least one claim of the later filed nonprovisional application in the manner provided by the first paragraph of 35 U.S.C. § 112. Each prior application must also be:

(i) An international application entitled to a filing date in accordance with PCT Article 11 and designating the United States of America; or

(ii) Complete as set forth in § 1.51(b); or

(iii) Entitled to a filing date as set forth in § 1.53(b) or § 1.53(d) and include the basic filing fee set forth in § 1.16; or

(iv) Entitled to a filing date as set forth in § 1.53(b) and have paid therein the processing and retention fee set forth in § 1.21(f) within the time period set forth in § 1.53(f).

37 C.F.R. § 1.78(a)(1).

NOTE: If the new application being transmitted is a divisional, continuation or a continuation-in-part of a parent case, or where the parent case is an International Application which designated the U.S., or benefit of a prior provisional application is claimed, then check the following item and complete and attach **ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED**.

WARNING: If an application claims the benefit of the filing date of an earlier filed application under 35 U.S.C. §§ 120, 121 or 365(c), the 20-year term of that application will be based upon the filing date of the earliest U.S. application that the application makes reference to under 35 U.S.C. §§ 120, 121 or 365(c). (35 U.S.C. § 154(a)(2) does not take into account, for the determination of the patent term, any application on which priority is claimed under 35 U.S.C. §§ 119, 365(a) or 365(b).) For a c-i-p application, applicant should review whether any claim in the patent that will issue is supported by an earlier application and, if not, the applicant should consider canceling the reference to the earlier filed application. The term of a patent is not based on a claim-by-claim approach. See Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,205.

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WARNING: When the last day of pendency of a provisional application falls on a Saturday, Sunday, or Federal holiday within the District of Columbia, any nonprovisional application claiming benefit of the provisional application must be filed prior to the Saturday, Sunday, or Federal holiday within the District of Columbia. See 37 C.F.R. § 1.78(a)(3).

- ☐ The new application being transmitted claims the benefit of prior U.S. application(s). Enclosed are ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

3. Papers Enclosed

- A. Required for filing date under 37 C.F.R. § 1.53(b) (Regular) or 37 C.F.R. § 1.153 (Design) Application

10 Pages of specification

2 Pages of claims

3 Sheets of drawing

WARNING: DO NOT submit original drawings. A high quality copy of the drawings should be supplied when filing a patent application. The drawings that are submitted to the Office must be on strong, white, smooth, and non-shiny paper and meet the standards according to § 1.84. If corrections to the drawings are necessary, they should be made to the original drawing and a high-quality copy of the corrected original drawing then submitted to the Office. Only one copy is required or desired. For comments on proposed then-new 37 C.F.R. § 1.84, see Notice of March 9, 1988 (1990 O.G. 57-62).

NOTE: "Identifying indicia, if provided, should include the application number or the title of the invention, inventor's name, docket number (if any), and the name and telephone number of a person to call if the Office is unable to match the drawings to the proper application. This information should be placed on the back of each sheet of drawing a minimum distance of 1.5 cm. (5/8 inch) down from the top of the page . . ." 37 C.F.R. § 1.84(c).

(complete the following, if applicable)

- ☐ The enclosed drawing(s) are photograph(s), and there is also attached a "PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWING(S)." 37 C.F.R. § 1.84(b).
- ☐ formal
- ☐ informal

B. Other Papers Enclosed

6 Pages of declaration and power of attorney

1 Pages of abstract

 Other

4. Additional papers enclosed

- ☐ Amendment to claims
- ☐ Cancel in this applications claims _____ before calculating the filing fee. (At least one original independent claim must be retained for filing purposes.)
- ☐ Add the claims shown on the attached amendment. (Claims added have been numbered consecutively following the highest numbered original claims.)
- ☐ Preliminary Amendment
- ☐ Information Disclosure Statement (37 C.F.R. § 1.98)
- ☐ Form PTO-1449 (PTO/SB/08A and 08B)
- ☐ Citations

- ☐ Declaration of Biological Deposit
- ☐ Submission of "Sequence Listing," computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.
- ☐ Authorization of Attorney(s) to Accept and Follow Instructions from Representative
- ☐ Special Comments
- ☐ Other

5. Declaration or oath (including power of attorney)

NOTE: A newly executed declaration is not required in a continuation or divisional application provided that the prior nonprovisional application contained a declaration as required, the application being filed is by all or fewer than all the inventors named in the prior application, there is no new matter in the application being filed, and a copy of the executed declaration filed in the prior application (showing the signature or an indication thereon that it was signed) is submitted. The copy must be accompanied by a statement requesting deletion of the names of person(s) who are not inventors of the application being filed. If the declaration in the prior application was filed under § 1.47, then a copy of that declaration must be filed accompanied by a copy of the decision granting § 1.47 status or, if a nonsigning person under § 1.47 has subsequently joined in a prior application, then a copy of the subsequently executed declaration must be filed. See 37 C.F.R. §§ 1.63(d)(1)-(3).

NOTE: A declaration filed to complete an application must be executed, identify the specification to which it is directed, identify each inventor by full name including family name and at least one given name, without abbreviation together with any other given name or initial, and the residence, post office address and country or citizenship of each inventor, and state whether the inventor is a sole or joint inventor. 37 C.F.R. § 1.63(a)(1)-(4).

☒ Enclosed

Executed by

(check all applicable boxes)

☒ inventor(s).

☐ legal representative of inventor(s).

37 C.F.R. §§ 1.42 or 1.43.

☐ joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached.

☐ This is the petition required by 37 C.F.R. § 1.47 and the statement required by 37 C.F.R. § 1.47 is also attached. See item 13 below for fee.

☐ Not Enclosed.

NOTE: Where the filing is a completion in the U.S. of an International Application or where the completion of the U.S. application contains subject matter in addition to the International Application, the application may be treated as a continuation or continuation-in-part, as the case may be, utilizing ADDED PAGE FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION CLAIMED.

☐ Application is made by a person authorized under 37 C.F.R. § 1.41(c) on behalf of all the above named inventor(s).

(The declaration or oath, along with the surcharge required by 37 C.F.R. § 1.16(e) can be filed subsequently).

☐ Showing that the filing is authorized.

(not required unless called into question. 37 C.F.R. § 1.41(d))

The inventorship for all the claims in this application are:

- or**

- ## 7. Language

☒ English

- ☐ The attached translation includes a statement that the translation is accurate. 37 C.F.R. § 1.52(d).

☒ An assignment of the invention to Nokia Mobile Phones Limited

- ☐ will follow.

WARNING: A newly executed "CERTIFICATE UNDER 37 C.F.R. § 3.73(b)" must be filed when a continuation-in-part application is filed by an assignee. Notice of April 30, 1993, 1150 O.G. 62-64.

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9. Certified Copy

Certified copy(ies) of application(s)

Country	Appln. No.	Filed
Finland	990800	12 April 1999
Country	Appln. No.	Filed
Country	Appln. No.	Filed

from which priority is claimed

☒ Is (are) attached.☐ will follow.

NOTE: The foreign application forming the basis for the claim for priority must be referred to in the oath or declaration. 37 C.F.R. § 1.55(a) and 1.63.

NOTE: This item is for any foreign priority for which the application being filed directly relates. If any parent U.S. application or International Application from which this application claims benefit under 35 U.S.C. § 120 is itself entitled to priority from a prior foreign application, then complete Item 18 on the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

10. Fee Calculation (37 C.F.R. § 1.16)A. ☒ Regular application

CLAIMS AS FILED				
Number filed		Number Extra	Rate	Basic Fee 37 C.F.R. § 1.16(a) \$ 690.00
Total				
Claims (37 C.F.R. § 1.16(c))	12	− 20 = 0	× \$ 18.00	0
Independent				
Claims (37 C.F.R. § 1.16(b))	3	− 3 = 0	× \$ 78.00	0
Multiple dependent claim(s), If any (37 C.F.R. § 1.16(d))				
			+ \$260.00	

☐ Amendment cancelling extra claims is enclosed.☐ Amendment deleting multiple-dependencies is enclosed.☐ Fee for extra claims is not being paid at this time.

NOTE: If the fees for extra claims are not paid on filing they must be paid or the claims cancelled by amendment, prior to the expiration of the time period set for response by the Patent and Trademark Office in any notice of fee deficiency. 37 C.F.R. § 1.16(d).

Filing Fee Calculation

\$ 690.00

B. ☐ Design application

(\$310.00—37 C.F.R. § 1.16(f))

Filing Fee Calculation

\$ _____

C. ☐ Plant application

(\$480.00—37 C.F.R. § 1.16(g))

Filing fee calculation

\$ _____

11. Small Entity Statement(s)

- ☐ Statement(s) that this is a filing by a small entity under 37 C.F.R. § 1.9 and 1.27 is (are) attached.

WARNING: "Status as a small entity must be specifically established in each application or patent in which the status is available and desired. Status as a small entity in one application or patent does not affect any other application or patent, including applications or patents which are directly or indirectly dependent upon the application or patent in which the status has been established. The refiling of an application under § 1.53 as a continuation, division, or continuation-in-part (including a continued prosecution application under § 1.53(d)), or the filing of a reissue application requires a new determination as to continued entitlement to small entity status for the continuing or reissue application. A nonprovisional application claiming benefit under 35 U.S.C. § 119(e), 120, 121, or 365(c) of a prior application, or a reissue application may rely on a statement filed in the prior application or in the patent if the nonprovisional application or the reissue application includes a reference to the statement in the prior application or in the patent or includes a copy of the statement in the prior application or in the patent and status as a small entity is still proper and desired. The payment of the small entity basic statutory filing fee will be treated as such a reference for purposes of this section." 37 C.F.R. § 1.28(a)(2).

WARNING: "Small entity status must not be established when the person or persons signing the . . . statement can unequivocally make the required self-certification." M.P.E.P., § 509.03, 6th ed., rev. 2, July 1996 (emphasis added).

(complete the following, if applicable)

- ☐ Status as a small entity was claimed in prior application
_____ / _____, filed on _____, from which benefit
is being claimed for this application under:

35 U.S.C. § ☐ 119(e),
☐ 120,
☐ 121,
☐ 365(c),

and which status as a small entity is still proper and desired.

- ☐ A copy of the statement in the prior application is included.

Filing Fee Calculation (50% of A, B or C above)

\$ _____

NOTE: Any excess of the full fee paid will be refunded if small entity status is established and a refund request are filed within 2 months of the date of timely payment of a full fee. The two-month period is not extendable under § 1.136. 37 C.F.R. § 1.28(a).

12. Request for International-Type Search (37 C.F.R. § 1.104(d))

(complete, if applicable)

- ☐ Please prepare an international-type search report for this application at the time when national examination on the merits takes place.

13. Fee Payment Being Made at This Time

☐ Not Enclosed

☐ No filing fee is to be paid at this time.

(This and the surcharge required by 37 C.F.R. § 1.16(e) can be paid subsequently.)

☒ Enclosed

☒ Filing fee

\$ 690.00

☒ Recording assignment

(\$40.00; 37 C.F.R. § 1.21(h))

(See attached "COVER SHEET FOR
ASSIGNMENT ACCOMPANYING NEW
APPLICATION".)

\$ 40.00

☐ Petition fee for filing by other than all the
inventors or person on behalf of the inventor
where inventor refused to sign or cannot be
reached

(\$130.00; 37 C.F.R. §§ 1.47 and 1.17(l))

\$

☐ For processing an application with a
specification in

a non-English language

(\$130.00; 37 C.F.R. §§ 1.52(d) and 1.17(k))

\$

☐ Processing and retention fee

(\$130.00; 37 C.F.R. §§ 1.53(d) and 1.21(l))

\$

☐ Fee for international-type search report

(\$40.00; 37 C.F.R. § 1.21(e))

\$

NOTE: 37 C.F.R. § 1.21(f) establishes a fee for processing and retaining any application that is abandoned for failing to complete the application pursuant to 37 C.F.R. § 1.53(f) and this, as well as the changes to 37 C.F.R. §§ 1.53 and 1.78(a)(1), indicate that in order to obtain the benefit of a prior U.S. application, either the basic filing fee must be paid, or the processing and retention fee of § 1.21(f) must be paid, within 1 year from notification under § 53(f).

Total fees enclosed

\$ 730.00

14. Method of Payment of Fees

☒ Check in the amount of \$ 730.00

☐ Charge Account No. _____ in the amount of
\$ _____

A duplicate of this transmittal is attached.

NOTE: Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37 C.F.R. § 1.22(b).

[illegible]

WARNING: Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.

- ☒ 37 C.F.R. § 1.16(a), (f) or (g) (filing fees)

- ☒ 37 C.F.R. § 1.16(b), (c) and (d) (presentation of extra claims)

☒ 37 C.F.R. § 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)

- ☒ 37 C.F.R. § 1.17(a)(1)–(5) (extension fees pursuant to § 1.136(a)).

- ☐ 37 C.F.R. § 1.17 (application processing fees)

NOTE: ". . . A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).

- ☐ 37 C.F.R. § 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. § 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b).

NOTE: 37 C.F.R. § 1.28(b) requires "Notification of any change in status resulting in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying, . . . the issue fee. . . ." From the wording of 37 C.F.R. § 1.28(b), (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

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16. Instructions as to Overpayment

NOTE: "... Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

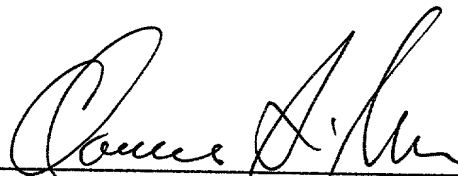
- ☒ Credit Account No. 16-1350
☐ Refund

SEND ALL CORRESPONDENCE TO:

Reg. No. 24,622

Tel. No. (203) 259-1800

Customer No.



SIGNATURE OF PRACTITIONER

Clarence A. Green

(type or print name of attorney)

PERMAN & GREEN, LLP

P.O. Address

425 Post Road, Fairfield, Connecticut 06430

☐ **Incorporation by reference of added pages**

(check the following item if the application in this transmittal claims the benefit of prior U.S. application(s) (including an international application entering the U.S. stage as a continuation, divisional or C-I-P application) and complete and attach the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED)

- ☐ Plus Added Pages for New Application Transmittal Where Benefit of Prior U.S. Application(s) Claimed

Number of pages added _____

- ☐ Plus Added Pages for Papers Referred to in Item 4 Above

Number of pages added _____

- ☐ Plus added pages deleting names of inventor(s) named in prior application(s) who is/are no longer inventor(s) of the subject matter claimed in this application.

Number of pages added _____

- ☐ Plus "Assignment Cover Letter Accompanying New Application"

Number of pages added _____

☒ **Statement Where No Further Pages Added**

(if no further pages form a part of this Transmittal, then end this Transmittal with this page and check the following item)

- ☒ This transmittal ends with this page.

NETWORK ELEMENT

FIELD OF THE INVENTION

- 5 The present invention relates to data transfer and particularly to a network element of a data transmission network, which network element comprises data transfer means for transmitting and receiving data from the data transmission network, which data comprises one or more commands; processing means for processing the data given in a specified format; and control means for modifying
10 the received command into a format required by the processing means.

BACKGROUND OF THE INVENTION

- 15 A functional unit or criterion in connection with electronic equipment, which unit or criterion uses or controls another system or component is generally called a driver. Typically, a driver is formed of a software module, which contains the necessary functionalities for connecting an equipment unit to a system through a specified equipment interface. This mainly means a program entity that relates to the equipment unit by means of which commands given by the system are interpreted
20 and modified into a format understood by the equipment unit, and vice versa.

- As the use of wireless terminals is expanding from voice communication into other forms of media and data services, the need for drivers to support functions to be added to a terminal is increasing. It is typical to wireless terminals that they have
25 lower memory capacity and performance than conventional terminals, and this also affects the arrangement of drivers in said environment.

- One example of a rapidly grown trend of development is smart card applications used with the help of a wireless terminal. For the use of a smart card, a card
30 reader, wherein a user places the smart card in connection with a service transaction, is connected to a terminal. The user gives the commands relating to the control of the use of the smart card with the help of the terminal's user interface. As necessary, the terminal takes care of the connection to a server that maintains the application, and the terminal comprises a driver that controls the
35 functions relating to the service transaction in the direction of both the server and the card.

- Smart card applications that have become common include electronic purses; there already is several service providers related to them. Typically, each purse
40 application has its own low level interface, which is still different depending on

which purse application is concerned or what type of card combination is in question. One card may also have several smart card applications, such as customer loyalty application, identity application, etc. It can already now be seen that as the number of applications and equipment manufacturers increases, arranging a separate driver for many different alternatives will cause problems as for the software required in a wireless terminal and the terminal's memory requirement.

Normally, a driver is arranged in a wireless terminal as a machine code, which the equipment manufacturer already includes in the terminal's software at the production stage. This means that the decisions on which smart card applications will be supported are already made at an early stage and substantially by the equipment manufacturer. Different equipment manufacturers may support different applications or even the same equipment manufacturer's different model generations may support different applications, which increases the diversity of the product range and makes it difficult for a user to decide on the alternatives. The software of a terminal is liable to become obsolete and maintaining software versions requires additional work from all parties of the service. In some more advanced models (e.g. Nokia 9110 Communicator), there is a possibility of afterwards downloading machine code into the terminal's memory, but in this kind of solution one would correspondingly end up maintaining data on each equipment manufacturer's way of arranging the downloading of the code afterwards. As for a new service provider, an arrangement according to prior art is inconvenient because, in addition to the actual client sales, the service provider has to see to it that as many equipment manufacturers as possible are willing to support the service in question.

SUMMARY OF THE INVENTION

Now, a solution has been found with the help of which a connection can be established between a network element and applications to be implemented in the network element in a flexible way and yet in a manner required to maintain safety. One preferred embodiment is to accomplish support for new smart card applications in a wireless terminal or with the help of an accessory that can be functionally connected thereto.

In a solution according to the invention, the control means of a network element comprise a driver the origin of which can be verified with the help of an electronic signature; and one or more functions that control the operation of processing

means, which can only be initiated by the driver, the origin of which has been verified with the help of the electronic signature.

5 The invention utilises the feature provided by new platforms to transfer bigger amounts of data, particularly program code, over the radio interface. In a solution according to the invention, a driver related to a given application is preferably arranged in a server from where it can be downloaded into the network element that executes the application. The driver is implemented as a byte compiled code and it is stored in the network element (e.g. in the terminal's non-volatile memory, 10 preferably in flash memory). The driver provides a High Level Application Programming Interface (HL-API) of a standard format for the application codes to be executed in the network element, which application codes are preferably downloaded into the network element at the operating stage. In connection with a smart card solution, when transferring data in the direction of the smart card the driver uses Application Protocol Data Units (APDU). A script library, preferably in machine language, is stored in the terminal. In connection with data transfer transactions the driver calls the functions of the script library. The APDU required at any given instant is provided to the function as a parameter.

20 For maintaining safety, the publisher of a driver preferably equips the driver with an electronic signature with the help of which it can be verified that the byte compiled code that is downloaded is expressly the software published by the publisher. The electronic signature can be verified at the downloading stage of the driver or if desired, for example, in connection with the initiation of the driver. If the driver's origin cannot be verified with the help of the electronic signature, the driver 25 will be rejected.

In a solution according to the invention, a fixed script library preferably stored in a network element at the production stage comprises at least two parts: a standard 30 script library and a restricted script library. The standard script library contains one or more functions, which can be called from any application code. Instead, the functions of the restricted script library can only be utilised by an application code the electronic signature of which has been successfully verified.

35 The invention makes it easier to support new applications in network elements, for example, arranging support for smart card applications in mobile terminals. A driver can preferably be downloaded into a terminal over the air interface, whereupon due to the byte compiled code and the low level interface of a standard format the same driver is suitable for use in different kinds of terminals, 40 independent of the manufacturer or even the terminal type. The possibility of using

a driver stored in a terminal, which driver provides a high level interface of a standard format decreases the size of the application code downloaded over the air and, thus, at the same time the connection time in connection with service transactions. The driver itself can be relatively big in size, but since it can be stored in a terminal, the act of downloading must seldom be carried out. An application programmer does not have to worry about how the applications are implemented on a lower level or in what way the implementations differ from each other or even with what kind of terminal or accessory of the terminal the application is supposed to be executed.

A solution according to the invention is safe, because the functions that potentially endanger safety are concentrated in the driver the publisher of which can always be verified with the help of the electronic signature. In addition, the implementation of those applications in which no functionalities to be implemented with the help of restricted script library data units are required, will also benefit from the accomplished flexibility. For organisations for which providing services is traditionally not very easy in the light of safety aspects, the opportunity provided by the invention to verify the origin of applications on the basis of the signature of the driver used provides an easier way to produce applications that have more demanding safety requirements.

BRIEF DESCRIPTION OF THE DRAWINGS

In the following, the invention will be described in detail by referring to the enclosed drawing, in which:

Figure 1 is a picture in principle of a WAP model (Wireless Application Protocol);

Figure 2 is a block diagram illustrating a wireless terminal to be used as a client;

Figure 3 studies, on a level of principle, an implementation of a smart card application according to the invention, presented according to functionalities;

Figure 4 shows in more detail an arrangement according to the invention for implementing a smart card application in a wireless terminal;

Figure 5 shows an embodiment of the invention; and

Figure 6 illustrates an arrangement for executing in a terminal applications intended for a single purpose of use.

DETAILED DESCRIPTION

WAP (Wireless Application Protocol) is an arrangement specified by the WAP Forum for implementing access to the Internet and advanced data services in wireless terminals. WAP provides, in principle, a scalable and expandable

platform in the layer-structured architecture of which a given protocol layer provides services for a subsequent layer. WAP architecture is very close to the www model known from the Internet, but optimisations and changes required by the wireless environment have been made therein. Figure 1 is a picture in principle of the WAP model, which enables a negotiation between a client and a server for providing a data object that is stored in the server in a format that can be understood by a reader. A client 1 sends an encoded service request over a wireless network 2 to a gateway 3. The gateway 3 decodes the request and transmits the request through Internet 4 to a server 5. The server 5 sends the requested content to the gateway 3, which encodes the content and sends it to the client 1 that made the service request. The received data object can be written out for the user to examine it through a user interface that is in connection with the client.

The block diagram in Figure 2 illustrates a wireless terminal that is used as a client. In the presented embodiment, a mobile station is used as a terminal without restricting the invention to the equipment type or terms used. The terminal can be any wireless communication means, such as, e.g. a duplex pager; a wireless PDA (Personal Digital Assistant); a WLAN terminal (Wireless Local Area Network) that uses Internet Protocol (IP); or a portable computer, which is equipped with a mobile network card that comprises an antenna to be added to the equipment port. The mobile station shown as block diagram in Figure 2 contains a radio unit for communication over the radio path, which comprises a transmitter branch (comprising functional blocks that carry out channel coding, interleaving, encryption, modulation and transmission) 21, known from a conventional mobile station, a receiver branch (comprising functional blocks that carry out reception, demodulation, decryption, de-interleaving, as well as channel decoding) 22, a duplex filter 23 that separates reception and transmission for transmission that takes place over the radio path, and an antenna 24. A central unit 25, which also implements the terminal's functionalities according to the communication protocol, controls the operation of the terminal in full. The mobile station comprises a memory 26, which contains volatile and non-volatile memory, and an interface unit 27, which comprises one or more equipment ports for coupling internal or external accessories to the mobile station. For communication with the user, the terminal comprises a user interface, which typically contains a keyboard; a display; a microphone; and a speaker. In connection with smart card applications, the interface unit 27 comprises a card reader through which the central unit 25 communicates with the card placed in the reader. The connection to a server is implemented through the radio unit 21, 22, 23, 24. The central unit 25 controls the implementation of the smart card application by carrying out the functions

arranged in the device's memory 26 programmable or by means of hardware structures, and preferably the functions of the application code downloaded from the server into the terminal.

5 Figure 2 showed the structural units of a wireless terminal that acts as a client according to Figure 1, particularly from the viewpoint of smart card applications. Correspondingly, the functional elements of a solution according to the invention are presented in Figure 3. The client in Figure 3 is formed of a wireless terminal
10 10 and a smart card 15. When the user wants to initiate the smart card application, an application code 31 is downloaded into the terminal 10 from a server. The terminal 10 comprises a driver 32, which initiated on the basis of the downloaded application code calls functions from a script library 33, stored in the device, which functions implement a specified data transfer connection with a
15 specified equipment unit; a smart card 15 in the example of Figure 3. The data transfer connection is implemented through Application Protocol Data Units (APDU) contained by the functions.

Figure 4 shows in more detail an arrangement according to the invention for implementing a smart card application in a wireless terminal. One or more drivers
20 41, 42, 43, stored in the terminal in the form of a byte compiled code, are downloaded into the terminal. In this context, a byte compiled code, i.e. byte code, means a program compiled from a source code. The commands of the byte code can be executed in a virtual machine arranged in the terminal. In this context, a virtual machine means software, which is included in the device's platform and
25 which enables to run the byte compiled code implemented in a language supported by the virtual machine and downloaded into the device. An advantage of a byte-compiled code is that application programmes can be developed irrespective of the application's operating environment. The code is of a standard format and, therefore, at the user end of the application, it should only be taken
30 care of that the correct virtual machine is included in the device's platform.

The best known example of a byte-compiled code is Java, known from the www environment. A WAP application layer WAE (Wireless Application Environment) provides a microbrowser suitable for a limited environment, where the data
35 description language is WML (Wireless Markup Language) and the programming language is WMLScript. For some its characteristics, WMLScript is like the JavaScript programming language, but WMLScript is optimised to function in terminals that use a limited bandwidth and have limited memory and computation capacities.

The drivers 41, 42, 43 provide a High Level Application Programming Interface (HL-API) of a standard format for an application code to be downloaded into the terminal at the operating stage. Preferably, a common interface is determined for different applications intended for the same use, whereupon the party that
5 implements the application using HL-API does not necessarily have to worry about the differences between the applications, and programming becomes easier. For example, in Figure 4, an interface 44 is an interface of applications relating to an electronic purse; an interface 45 is an interface relating to customer loyalty applications; and an interface 46 is an interface relating to health care
10 applications.

The script library stored in the terminal 10 comprises two parts: a standard script library 47 and a restricted script library 48. The script libraries 47, 48 preferably
15 comprise one or more functions implemented and stored in machine language. In this context, a machine code means a file processed by a compiler from a program in source language, which is ready to be run by the device's processor when called by the device's operating system. The functions of the standard script library 47 according to the invention are basic functions (e.g. functions of the user interface, mathematical functions), which any driver stored in or downloaded into
20 the terminal can call.

A restricted script library 48 comprises functions, which enable transparent data transfer between an application code and the smart card 15. This kind of function can be, for example, *sendAPDU(CommandAPDU)*, which is given the APDU,
25 contained by the driver according to the application code's HL-API command, as a parameter. Thus, there is a generic Low Level Application Programming Interface (LL-API) between the driver and the smart card, and substantially any application code commands relating to the initiated application are transparently transmitted from the driver through the LL-API to the smart card, and vice versa. HL-API
30 facilitates the implementation of the application code, because the application implementator does not necessarily have to know the details of individual solutions; correspondingly, LL-API enables a transparent communication connection between the driver and the smart card, independent of the driver.

35 However, it is clear that the genericity of the presented arrangement as such contains a potential risk concerning dishonest application providers or application code implementators. A writer of an application code may, for example, include in the code a command to transfer a small amount of money into his one account in connection with each purse transaction. To avoid the safety risk, in an
40 arrangement according to the invention the functions of a restricted script library

can only be called by a driver the origin of which has been verified with the help of an electronic signature.

In an electronic signature, public key encryption technique is utilised, e.g. RSA algorithm. In addition, in a WAP environment elliptic curves, among other things, are utilised in electronic signatures. Solutions implemented by means of different electronic signing techniques are equivalent as for the invention. In the following, one possible embodiment will be presented with the help of the functional diagram shown in Figure 5. A message 51 to be signed, i.e. in this case, a driver code in a server is processed by a hash function 52 which, with the help of a specified algorithm (e.g. MD5) computes a fixed-length hash 53 from the message. The hash function 52 is a one-way function and the hash 53 produced by it will change immediately if the original message 51 is changed even a little. The hash 53 is processed by an encryption function 54 using the secret key of the publisher of the driver as the encryption key. The result of the operation is an electronic signature 55, which is added to the driver code. When there is a desire to verify the driver, the signature is first decoded using the public key of the driver's publisher. After this, the driver code is processed by the hash function. If said public key decodes the signature and the decoded character string corresponds to the computed hash, it is known that the driver originates from the desired source and that the code has not been tampered after the publication. The chain of confidence substantially presupposes the transfer of a public key, and the accomplished safety level is very good.

Figure 6 illustrates in more detail an arrangement for implementing terminal applications intended for a single use. In the case shown in Figure 6, it is a question of an electronic purse, wherein there preferably is a driver 61, 62, 63 for each purse application provider, provided by the provider itself, which can be downloaded into the terminal from a server, when necessary. However, due to HL-API, the application code relating to a payment transaction can be the same for all the different purse applications. A downloaded driver, the authenticity of which has been verified with the help of an electronic signature either in connection with downloading or in connection with a payment transaction, is able to call functions of both a standard script library and a restricted library and, thus, to control the performance of the payment transaction maintaining the safety requirements between the payment server and the smart card.

In the following, the downloading of a driver into a terminal will be examined with the help of an example. A user has made an agreement on smart card bases with a company X that offers a payment application. The company provides the user

with a smart card, which contains an electronic purse application XCash. In order to obtain into his terminal the driver relating to the XCash application in question the user, for example:

- a) activates his WAP phone, whereto an external smart card reader has been connected. He sends the WAP server of the company X (e.g. by selecting a suitable link) a request to download XCash support into his WAP phone. Or
- b) pushes a new XCash card into the WAP phone card reader. The card reader, i.e. the terminal, sends the smart card a reset signal and after resetting, the smart card responds by sending an Answer To Reset (ATR) sequence to the card reader. On the basis of the information obtained in the ATR response, the card reader concludes that it is a question of a new cash card application and automatically initiates the downloading of the driver from a server. To be able to initiate downloading, the terminal needs address information in order to be able to locate the server from which the driver can be downloaded. The address (e.g. Universal Resource Locator, URL) may have been stored, e.g. in the smart card itself or in the terminal. One possibility is to arrange in the network a server by which drivers are maintained for different kinds of smart card applications or wherein information (e.g. URL) is stored on the basis of which the terminal finds the correct driver.

By utilising Wireless Application Protocol (WAP), the user sends the server a request to send the selected driver into the WAP phone. The server sends the driver, which contains the electronic signature. The electronic signature can be verified at this stage before storing the driver in the terminal's non-volatile memory (e.g. cache). If the memory space is about to become full, the user may be requested to remove older drivers, left unused.

In the following, the use of a downloaded driver in a terminal will be examined with the help of an example. The user browses by his WAP phone the content in a WAP server and becomes interested in a WML document liable to charge, offered by a company Y. After expressing his willingness to pay the document in question as XCash service, the server transfers a WMLScript application code into the user's WAP phone. The WAP phone's platform contains a WMLScript virtual machine, which begins to execute the downloaded WMLScript application code. In order to initiate the transfer of the sum of EUR 10, the application code gives a HL-API command

EPurse.StartPayment("XCash", "EUR", 10, "serverAddress")

which causes the XCash driver stored in the terminal to initiate. The driver controls payment transactions in the terminal by calling, e.g. a function of the standard script library to inquire through a user interface the user's authorisation for the

payment and, after obtaining the authorisation, gives a suitable APDU to the XCash card with the help of a function of the restricted library. Correspondingly, the driver controls with the help of the WAP browser the connection to the payment server of the company Y and possibly also the company X taking care of the payment transaction towards the network in a well-known manner. When the company Y has been informed that the payment transaction has been concluded it transfers the desired document over the network into the user's WAP phone.

In the embodiments presented above, LL-API is an interface through which it is possible to send APDUs to a processing device, here to a smart card, to be connected to a terminal. However, a solution according to the invention can also be applied to other environments, where a connection from an application program to a performance means that implements the application should be established flexibly but at the same time, maintaining a sufficient safety level. The performance means can be a processor connected to a network element or an internal processor of the network element. Correspondingly, LL-API can be, e.g. Socket API with the help of which a connection is opened between the application program and a server, which is in the network. Downloading a driver from the network enables flexibility and speed in connection with new applications, and LL-API guarantees that a connection can only be established by a driver the origin of which can be verified. Another embodiment is LL-API of a GPS device (Global Positioning System) to be connected to a terminal, which enables the flexible introduction of applications that utilise positioning at the same time maintaining the possibility of controlling the origin of the application program that obtains location data.

This paper presents the implementation and embodiments of the present invention with the help of examples. A person skilled in the art will appreciate that the present invention is not restricted to details of the embodiments presented above, and that the invention can also be implemented in another form without deviating from the characteristics of the invention. Consequently, for example, a terminal can also be other than the WAP phone presented above. Thus, the possibilities of implementing and using the invention are only restricted by the enclosed claims, and the various options of implementing the invention as determined by the claims, including the equivalent implementations, also belong to the scope of the invention.

CLAIMS

1. A network element of a data transmission network, which network element comprises
 - 5 data transfer means for transmitting and receiving data from the data transmission network, which data comprises one or more commands;
 - processing means for processing data provided in a specified format;
 - control means for modifying one or more commands received into a format required by the processing means;
 - 10 wherein said control means comprise a driver the origin of which can be verified with the help of an electronic signature;
 - one or more functions that control the operation of the processing means, which functions can only be initiated by the driver the origin of which has been
 - 15 verified with the help of the electronic signature.
2. A network element according to claim 1, wherein said network element is a wireless terminal.
- 20 3. A network element according to claim 2, wherein said terminal contains means for connecting the application processing means to the terminal.
4. A network element according to claim 3, wherein said processing means comprise the application processing means.
- 25 5. A network element according to claim 1, wherein said driver is stored in the network element as a byte compiled code.
- 30 6. A network element according to claim 5, wherein said electronic signature comprises a character string, processed by the secret key of the publisher of said code, whereupon the verification of the driver's origin takes place by decrypting the encryption of the character string by the code of publisher's public key.
- 35 7. A network element according to claim 6, wherein said character string comprises a hash computed from said code by a specified hash function.
- 40 8. A network element according to claim 1, wherein a driver relating to a specific use is arranged to receive a command in a specified format to be determined according to use.

9. A data transmission network, a network element, which comprises
data transfer means for transmitting and receiving data from the data
transmission network, which data comprises one or more commands;
5 processing means for processing data provided in a specified format;
control means for modifying the received command into a format required
by the processing means;
wherein said control means comprise
a driver the origin of which can be verified with the help of an electronic
10 signature;
one or more functions that control the operation of the processing means,
which functions can only be initiated by the driver the origin of which has been
verified with the help of the electronic signature.

15 10. A data transmission network according to claim 9, wherein said network
element is a wireless terminal.

20 11. A data transmission network according to claim 9, wherein said network
element is a network server.

25 12. A method for processing data, the method comprising:
transmitting and receiving data from a data transmission network, which
data comprises one or more commands:
modifying the received command into a specified format:
25 processing the data that is in the specified format;
wherein it comprises
modifying the command by a driver the origin of which can be verified with
the help of an electronic signature:
controlling the processing by functions, which functions can only be
30 initiated by the driver the origin of which has been verified with the help of the
electronic signature.

ABSTRACT

A solution for controlling activities to be carried out in a network element in a flexible and safe manner. A data transmission network comprises a network element, which comprises data transfer means (21, 22, 23, 24) for transmitting and receiving data from the data transmission network, which data comprises one or more commands: processing means (15, 25) for processing the data provided in a specified format; and control means (25, 27, 28, 29) for modifying the received command into a format required by the processing means. Said control means comprise a driver (41, 42, 43) the origin of which can be verified with the help of an electronic signature; and one or more functions (48) that control the operation of the processing means (15, 25), which can only be initiated by the driver (41, 42, 43) the origin of which has been verified with the help of the electronic signature.

(Figure 4)

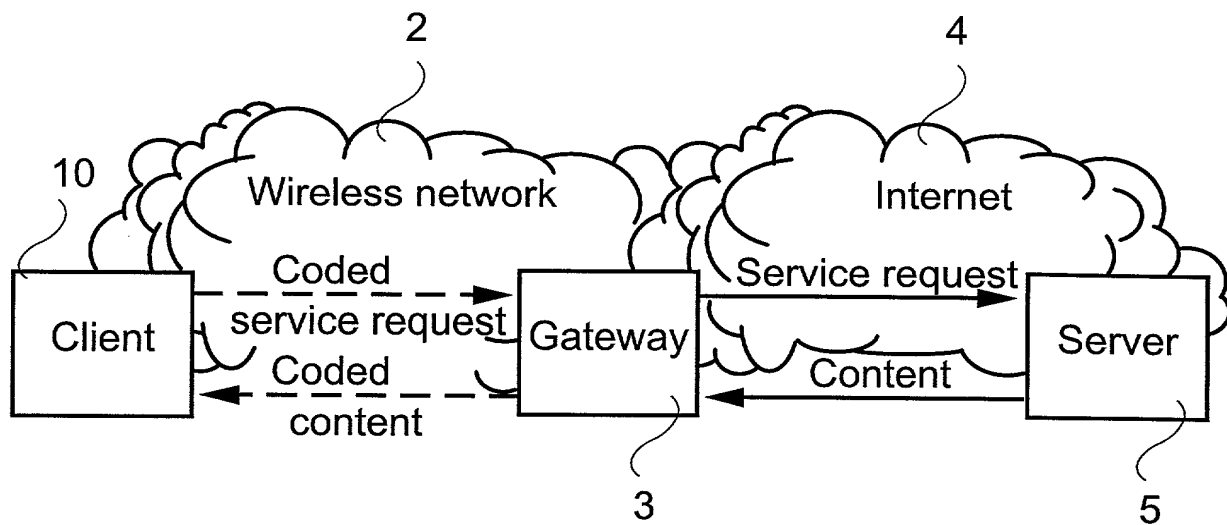


FIGURE 1

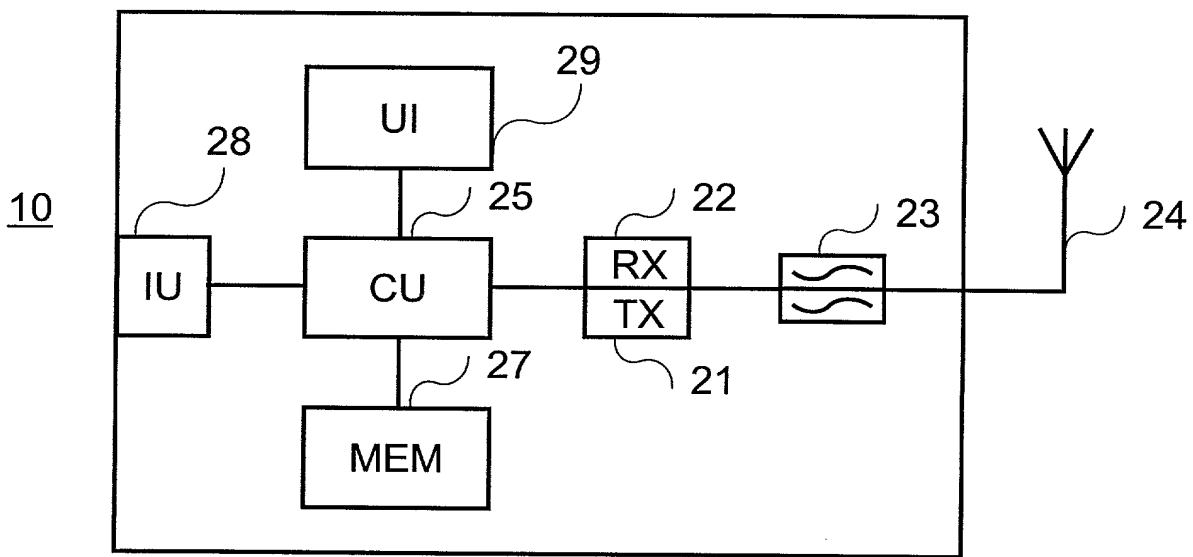


FIGURE 2

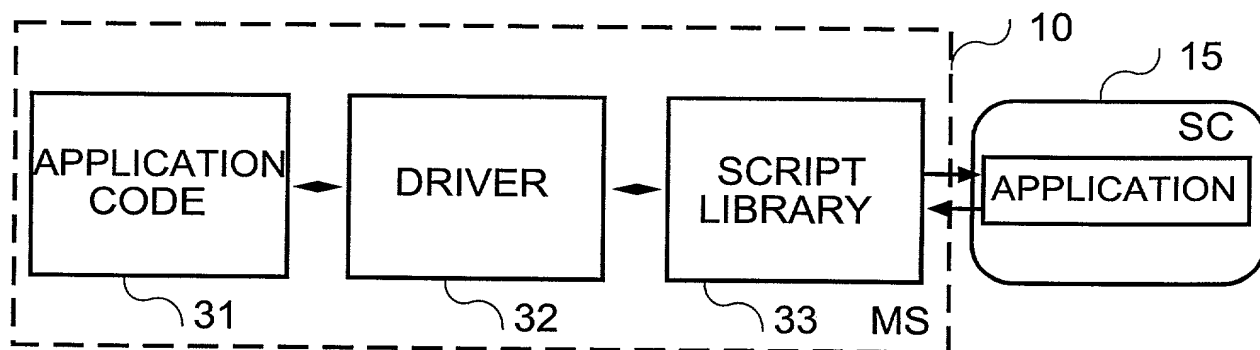


FIGURE 3

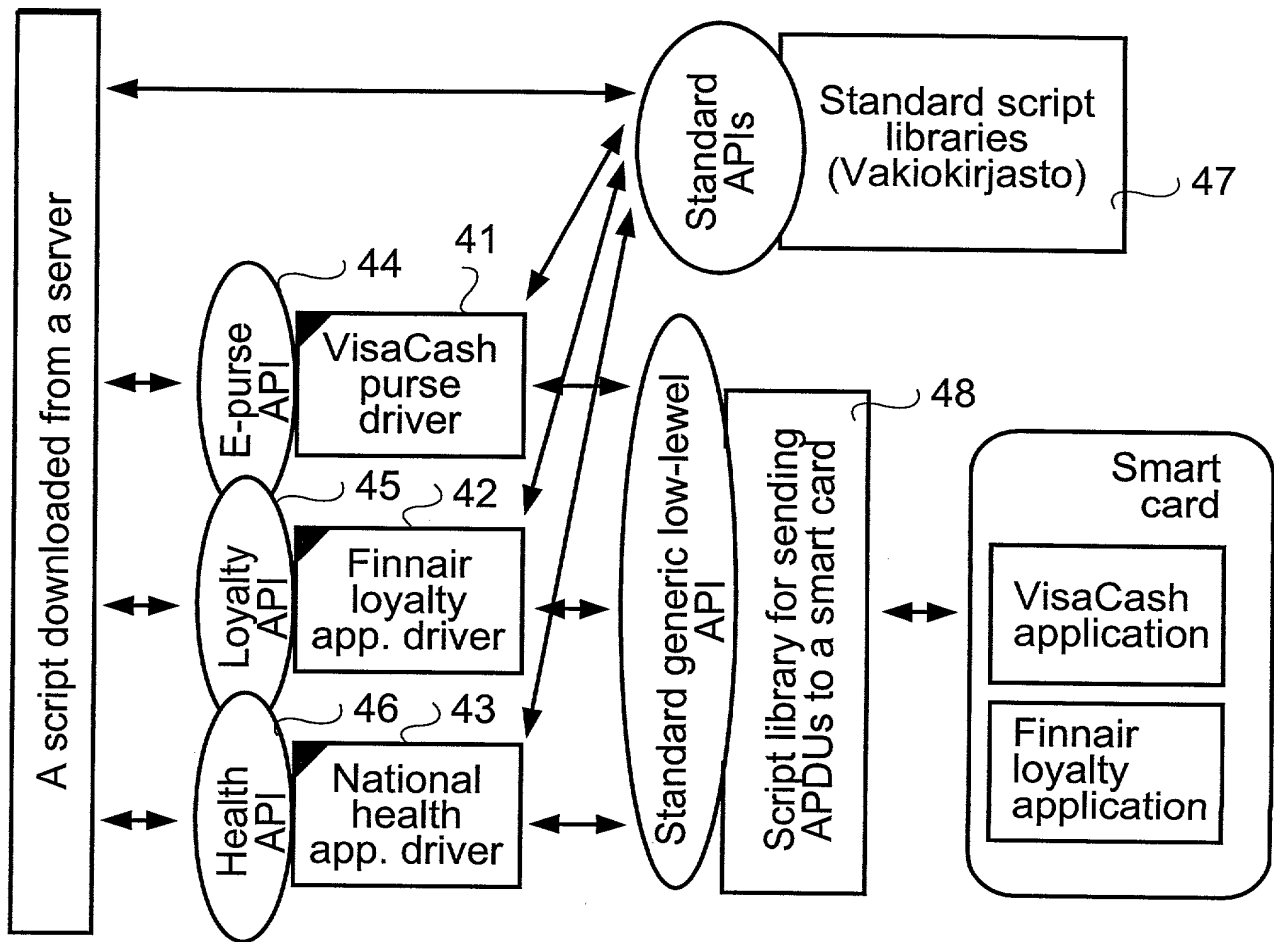


FIGURE 4

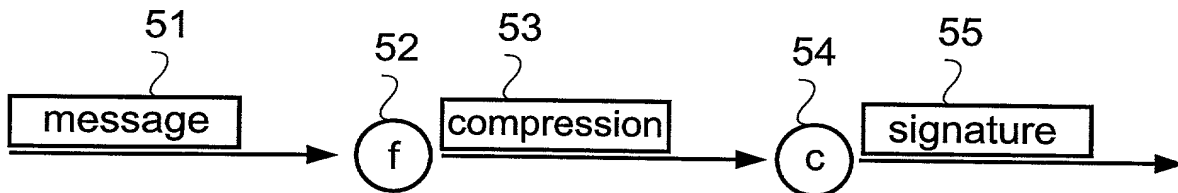


FIGURE 5

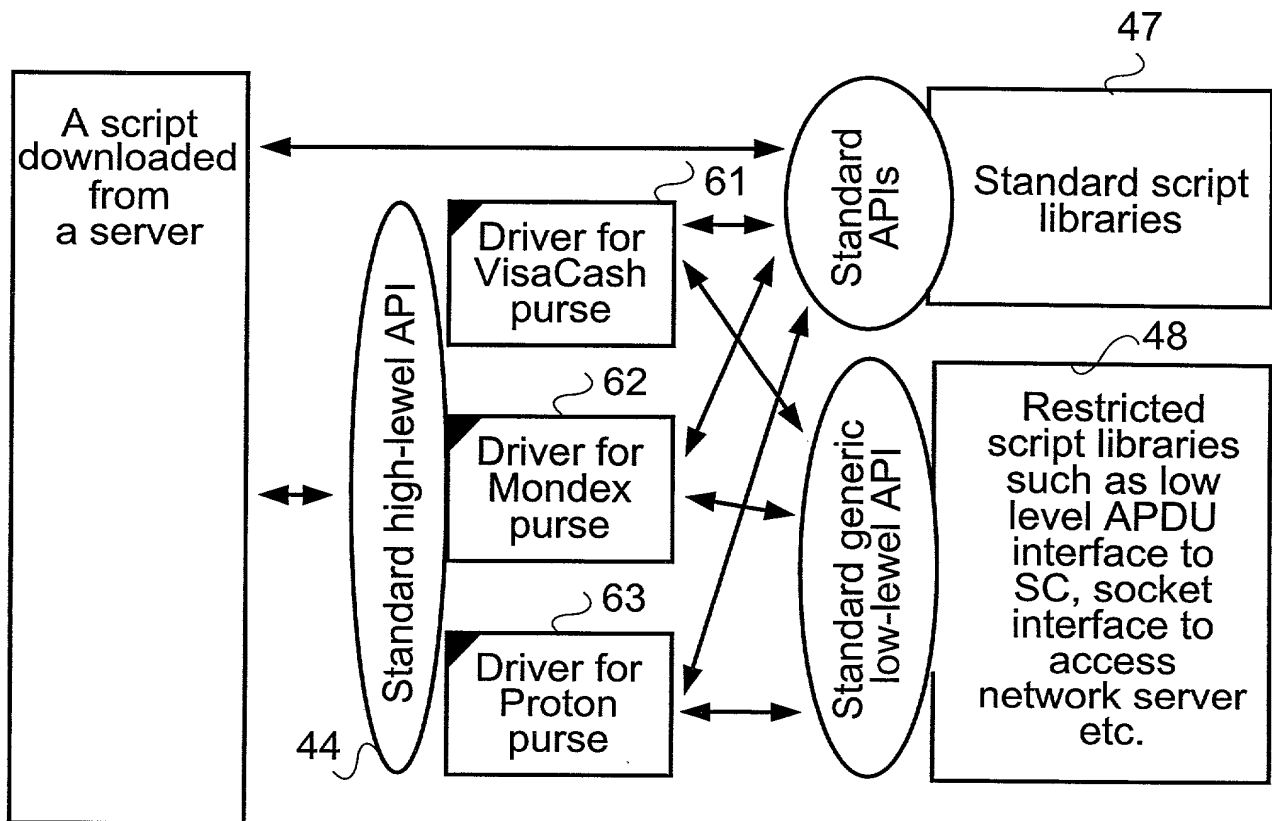


FIGURE 6

Attorney's Docket No. _____

PATENT

COMBINED DECLARATION AND POWER OF ATTORNEY

(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL, DIVISIONAL,
CONTINUATION OR C-I-P)

As a below named inventor, I hereby declare that:

TYPE OF DECLARATION

This declaration is of the following type: (check one applicable item below)

- ☒ original
☐ design
☐ supplemental

NOTE: If the declaration is for an International Application being filed as a divisional, continuation or continuation-in-part application, do not check next item; check appropriate one of last three items.

- ☐ national stage of PCT

NOTE: if one of the following 3 items apply, then complete and also attach ADDED PAGES FOR DIVISIONAL, CONTINUATION OR C-I-P.

- ☐ divisional
☐ continuation
☐ continuation-in-part (C-I-P)

INVENTORSHIP IDENTIFICATION

WARNING: If the inventors are each not the inventors of all the claims, an explanation of the facts, including the ownership of all the claims at the time the last claimed invention was made, should be submitted.

My residence, post office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TITLE OF INVENTION

Network element

SPECIFICATION IDENTIFICATION

the specification of which: (complete (a), (b) or (c))

- (a) ☒ is attached hereto.
(b) ☐ was filed on _____ as ☐ Serial No. 0 / _____
or ☐ Express Mail No., as Serial No. not yet known _____
and was amended on _____ (if applicable)

(Declaration and Power of Attorney [1-1]-page 1 of 5)

NOTE: Amendments filed after the original papers are deposited with the PTO which contain new matter are not accorded a filing date by being referred to in the declaration. Accordingly, the amendments involved are those filed with the application papers or, in the case of a supplemental declaration, are those amendments claiming matter not encompassed in the original statement of invention or claims. See 37 CFR 1.67.

- (c) ☐ was described and claimed in PCT International Application No. _____ filed on _____ and as amended under PCT Article 19 on _____ (if any).

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information

- ☒ which is material to patentability as defined in 37, Code of Federal Regulations, § 1.56
(also check the following items, if desired)

- ☒ and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable examiner would consider it important in deciding whether to allow the application to issue as a patent, and
☐ In compliance with this duty there is attached an information disclosure statement in accordance with 37 CFR 1.98.

PRIORITY CLAIM (35 U.S.C. § 119)

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate or of any PCT International application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT International application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

(complete (d) or (e))

- (d) ☐ no such applications have been filed.
(e) ☒ such applications have been filed as follows.

NOTE: Where item (c) is entered above and the International Application which designated the U.S. itself claimed priority check item (e), enter the details below and make the priority claim.

**A. PRIOR FOREIGN/PCT APPLICATION(S) FILED WITHIN 12 MONTHS
(6 MONTHS FOR DESIGN) PRIOR TO THIS APPLICATION
AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. § 119**

COUNTRY (OR INDICATE IF PCT)	APPLICATION NUMBER	DATE OF FILING (day, month , year)	PRIORITY CLAIMED UNDER 37 USC 119
Finland	990800	12.04.1999	<input checked="" type="checkbox"/> YES NO <input type="checkbox"/>
			<input type="checkbox"/> YES NO <input type="checkbox"/>
			<input type="checkbox"/> YES NO <input type="checkbox"/>
			<input type="checkbox"/> YES NO <input type="checkbox"/>
			<input type="checkbox"/> YES NO <input type="checkbox"/>

**ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS
(6) MONTHS FOR DESIGN PRIOR TO THIS U.S. APPLICATION**

NOTE: If the application filed more than 12 months from the filing date of this application is a PCT filing forming the basis for this application entering the United States as (1) the national stage, or (2) a continuation, divisional, or continuation-in-part, then also complete ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR C-I-P APPLICATION for benefit of the prior U.S. or PCT application(s) under 35 U.S.C. § 120.

POWER OF ATTORNEY

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.
(List name and registration number)

Clarence A. Green (24,622)
Harry F. Smith (32,493)
Mark F. Harrington (31,686)

(check the following item, if applicable)

☐ Attached as part of this declaration and power of attorney is the authorization of the above- named attorney(s) to accept and follow instructions from my representative(s).

000140" 66494560

SEND CORRESPONDENCE TO

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Fairfield, CT 06430-6232

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(Name and telephone number)
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DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE(S)

NOTE: Carefully indicate the family (or last) name as it should appear on the filing receipt and all other documents.

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Residence Helsinki, Finland

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Variable	Mean	Standard Deviation	Minimum	Maximum
Age	34.5	10.2	22	55
Gender	0.5	0.5	0	1
Marital Status	0.7	0.5	0	1
Education	12.5	1.5	10	15
Income	3500	1500	1000	7000
Health	0.8	0.3	0	1
Smoking	0.2	0.4	0	1
Alcohol	0.1	0.3	0	1
Exercise	0.3	0.5	0	1
Stress	0.6	0.4	0	1
Sleep	0.7	0.3	0	1
Diet	0.5	0.5	0	1
Work	0.8	0.3	0	1
Family	0.6	0.4	0	1
Friends	0.7	0.3	0	1
Hobbies	0.5	0.5	0	1
Travel	0.4	0.5	0	1
Volunteering	0.3	0.5	0	1
Religion	0.6	0.4	0	1
Politics	0.5	0.5	0	1
Environment	0.7	0.3	0	1
Technology	0.8	0.3	0	1
Art	0.4	0.5	0	1
Music	0.6	0.4	0	1
Gardening	0.3	0.5	0	1
Fishing	0.2	0.4	0	1
Reading	0.7	0.3	0	1
Writing	0.4	0.5	0	1
Cooking	0.6	0.4	0	1
Cleaning	0.5	0.5	0	1
Shopping	0.7	0.3	0	1
Driving	0.8	0.3	0	1
Traveling	0.6	0.4	0	1
Volunteering	0.3	0.5	0	1
Religion	0.6	0.4	0	1
Politics	0.5	0.5	0	1
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Cooking	0.6	0.4	0	1
Cleaning	0.5	0.5	0	1
Shopping	0.7	0.3	0	1
Driving	0.8	0.3	0	1
Traveling	0.6	0.4	0	1
Volunteering	0.3	0.5	0	1
Religion	0.6	0.4	0	1
Politics	0.5	0.5	0	1
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Technology	0.8	0.3	0	1
Art	0.4	0.5	0	1
Music	0.6	0.4	0	1
Gardening	0.3	0.5	0	1
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Reading	0.7	0.3	0	1
Writing	0.4	0.5	0	1
Cooking	0.6	0.4	0	1
Cleaning	0.5	0.5	0	1
Shopping	0.7	0.3	0	1
Driving	0.8	0.3	0	1
Traveling	0.6	0.4	0	1
Volunteering	0.3	0.5	0	1
Religion	0.6	0.4	0	1
Politics	0.5	0.5	0	1
Environment	0.7	0.3	0	1
Technology	0.8	0.3	0	1
Art	0.4	0.5	0	1
Music	0.6	0.4	0	1
Gardening	0.3	0.5	0	1
Fishing	0.2	0.4	0	1
Reading	0.7	0.3	0	1
Writing	0.4	0.5	0	1
Cooking	0.6	0.4	0	1
Cleaning	0.5	0.5	0	1
Shopping	0.7	0.3	0	1
Driving	0.8	0.3	0	1
Traveling	0.6	0.4	0	1
Volunteering	0.3	0.5	0	1
Religion	0.6	0.4	0	1
Politics	0.5	0.5	0	1
Environment	0.7	0.3	0	1
Technology	0.8	0.3	0	1
Art	0.4	0.5	0	

(GIVEN NAME)

(MIDDLE INITIAL OR NAME)

FAMILY (OR LAST NAME)

Date _____ Country of Citizenship Finland

Residence Oulu, Finland

Post Office Address Telkkätie 4 B, FIN-90150 Oulu, Finland

☐ Signature for fourth and subsequent joint inventors. *Number of pages added* 1
 . . .

☐ Signature by administrator(trix), executor(trix) or legal representative for deceased or incapacitated inventor. *Number of pages added* _____

...

☐ Signature for inventor who refuses to sign or cannot be reached by person
authorised under 37 CFR 1.47. *Number of pages added* _____

☐ Added page for signature by one joint inventor on behalf of deceased inventor(s) where legal representative cannot be appointed in time (37 CFR 1.47).

...

☐ Added pages to combined declaration and power of attorney for divisional, continuation, or continuation-in-part (C-I-P) application. ☐ Number of pages added _____

☐ Authorization of attorney(s) to accept and follow instructions from representative.

...

(If no further pages form a part of this Declaration, then end this Declaration with this page and check the following item:)

☐ This declaration ends with this page.

(Declaration and Power of Attorney [1-1]-page 5 of 5)

SIGNATURE(S)

NOTE: Carefully indicate the family (or last) name as it should appear on the filing receipt and all other documents.

Full name of fourth inventor, if any

Piotr

(GIVEN NAME)

(MIDDLE INITIAL OR NAME)

Cofta

FAMILY (OR LAST NAME)

Inventor's signature _____

Date _____ Country of Citizenship Poland

Residence Gdansk, Poland

Post Office Address Arctowskiego 8a/8, 80-288 Gdansk, Poland

Full name of fifth joint inventor, if any

(GIVEN NAME)

(MIDDLE INITIAL OR NAME)

FAMILY (OR LAST NAME)

Inventor's signature _____

Date _____ Country of Citizenship _____

Residence _____

Post Office Address _____

000140 "Patent" 60

Attorney's Docket No. _____

PATENT

COMBINED DECLARATION AND POWER OF ATTORNEY

(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL, DIVISIONAL,
CONTINUATION OR C-I-P)

As a below named inventor, I hereby declare that:

TYPE OF DECLARATION

This declaration is of the following type: (check one applicable item below)

- ☒ original
☐ design
☐ supplemental

NOTE: If the declaration is for an International Application being filed as a divisional, continuation or continuation-in-part application, do not check next item; check appropriate one of last three items.

☐ national stage of PCT

NOTE: if one of the following 3 items apply, then complete and also attach ADDED PAGES FOR DIVISIONAL, CONTINUATION OR C-I-P.

- ☐ divisional
☐ continuation
☐ continuation-in-part (C-I-P)

INVENTORSHIP IDENTIFICATION

WARNING: If the inventors are each not the inventors of all the claims, an explanation of the facts, including the ownership of all the claims at the time the last claimed invention was made, should be submitted.

My residence, post office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TITLE OF INVENTION

Network element

SPECIFICATION IDENTIFICATION

the specification of which: (complete (a), (b) or (c))

- (a) ☒ is attached hereto.
(b) ☐ was filed on _____ as ☐ Serial No. 0 _____ / _____
or ☐ Express Mail No., as Serial No. not yet known _____
and was amended on _____ (if applicable)

(Declaration and Power of Attorney [1-1]-page 1 of 5)

NOTE: Amendments filed after the original papers are deposited with the PTO which contain new matter are not accorded a filing date by being referred to in the declaration. Accordingly, the amendments involved are those filed with the application papers or, in the case of a supplemental declaration, are those amendments claiming matter not encompassed in the original statement of invention or claims. See 37 CFR 1.67.

- (c) ☐ was described and claimed in PCT International Application No. _____ filed on _____ and as amended under PCT Article 19 on _____ (if any).

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information

- ☒ which is material to patentability as defined in 37, Code of Federal Regulations, § 1.56
(also check the following items, if desired)
- ☒ and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable examiner would consider it important in deciding whether to allow the application to issue as a patent, and
- ☐ In compliance with this duty there is attached an information disclosure statement in accordance with 37 CFR 1.98.

PRIORITY CLAIM (35 U.S.C. § 119)

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate or of any PCT International application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT International application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

(complete (d) or (e))

- (d) ☐ no such applications have been filed.
- (e) ☒ such applications have been filed as follows.

NOTE: Where item (c) is entered above and the International Application which designated the U.S. itself claimed priority check item (e), enter the details below and make the priority claim.

Variable	Mean	SD	Min	Max
Age	34.5	10.2	18	65
Gender	0.5	0.5	0	1
Marital status	0.6	0.5	0	1
Education	12.5	1.5	9	16
Income	1500	500	500	3000
Health status	0.7	0.4	0	1
Smoking status	0.3	0.5	0	1
Alcohol consumption	0.2	0.4	0	1
Exercise frequency	0.5	0.5	0	1
Stress level	0.6	0.4	0	1
Sleep quality	0.7	0.4	0	1
Work satisfaction	0.6	0.5	0	1
Life satisfaction	0.7	0.4	0	1
Overall health	0.8	0.3	0	1
Physical activity	0.4	0.5	0	1
Mental health	0.6	0.4	0	1
Social support	0.5	0.5	0	1
Work-life balance	0.6	0.4	0	1
Financial stability	0.7	0.4	0	1
Family harmony	0.8	0.3	0	1
Personal growth	0.6	0.4	0	1
Community involvement	0.5	0.5	0	1
Environmental awareness	0.7	0.4	0	1
Cultural appreciation	0.8	0.3	0	1
Artistic expression	0.6	0.4	0	1
Volunteer work	0.5	0.5	0	1
Charitable contributions	0.4	0.5	0	1
Philanthropic activities	0.3	0.4	0	1
Leadership roles	0.2	0.4	0	1
Networking efforts	0.1	0.3	0	1
Professional development	0.6	0.4	0	1
Continuous learning	0.7	0.4	0	1
Adaptability to change	0.8	0.3	0	1
Resilience to stress	0.9	0.2	0	1
Emotional stability	0.7	0.4	0	1
Self-awareness	0.6	0.4	0	1
Empathy towards others	0.8	0.3	0	1
Effective communication	0.7	0.4	0	1
Conflict resolution skills	0.6	0.4	0	1
Decision-making abilities	0.8	0.3	0	1
Problem-solving skills	0.7	0.4	0	1
Time management	0.6	0.4	0	1
Organization skills	0.7	0.4	0	1
Attention to detail	0.8	0.3	0	1
Initiative and proactivity	0.6	0.4	0	1
Teamwork and collaboration	0.7	0.4	0	1
Leadership potential	0.5	0.5	0	1
Networking success	0.4	0.5	0	1
Professional growth	0.6	0.4	0	1
Career advancement	0.5	0.5	0	1
Job satisfaction	0.7	0.4	0	1
Work-life balance	0.6	0.4	0	1
Financial stability	0.8	0.3	0	1
Family harmony	0.9	0.2	0	1
Personal growth	0.7	0.4	0	1
Community involvement	0.6	0.4	0	1
Environmental awareness	0.8	0.3	0	1
Cultural appreciation	0.9	0.2	0	1
Artistic expression	0.7	0.4	0	1
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Initiative and proactivity	0.6	0.4	0	1
Teamwork and collaboration	0.7	0.4	0	1
Leadership potential	0.5	0.5	0	1
Networking success	0.4	0.5	0	1
Professional growth	0.6	0.4	0	1
Career advancement	0.5	0.5	0	1
Job satisfaction	0.7			

**ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS
(6) MONTHS FOR DESIGN PRIOR TO THIS U.S. APPLICATION**

POWER OF ATTORNEY

Clarence A. Green (24,622)
Harry F. Smith (32,493)
Mark F. Harrington (31,686)

Declaration and Power of Attorney [1-1]-page 3 of 5)

SEND CORRESPONDENCE TO

Perman & Green
425 Post Road
Fairfield, CT 06430-6232

DIRECT TELEPHONE CALLS TO:

(Name and telephone number)
Mark F. Harrington

(203) 259-1800

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE(S)

NOTE: Carefully indicate the family (or last) name as it should appear on the filing receipt and all other documents.

Full name of sole or first inventor

Mikael

(GIVEN NAME)

(MIDDLE INITIAL OR NAME)

Linden

FAMILY (OR LAST NAME)

Inventor's signature _____

Date _____ Country of Citizenship Finland

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Olli

(GIVEN NAME)

(MIDDLE INITIAL OR NAME)

Immonen

FAMILY (OR LAST NAME)

Inventor's signature 

Date 18-1-2000 Country of Citizenship Finland

Residence Helsinki, Finland

Post Office Address Tuohuskuja 16 A 5, FIN-00670 Helsinki, Finland

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NOTE: Carefully indicate the family (or last) name as it should appear on the filing receipt and all other documents.

Full name of fourth inventor, if any

Piotr

(GIVEN NAME)

L

(MIDDLE INITIAL OR NAME)

Cofta

FAMILY (OR LAST NAME)

Inventor's signature

Date 07-Feb-2000

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Full name of fifth joint inventor, if any

(GIVEN NAME)

(MIDDLE INITIAL OR NAME)

FAMILY (OR LAST NAME)

Inventor's signature

Date _____

Country of Citizenship

Residence

Post Office Address